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"of courtesy to the man for the sake of the high office, from which not even the American President is spared, is more than bad taste, more than a display of ill-breeding,—it is demoralising and dangerous. And the man who, in the press, or on the platform, or anywhere, fails in that delicate and noble consideration, seems to me to want one of the first qualities of the perfect citizen. He is false to his own better nature, and disrespectful to the long series of names which have rendered illustrious the annals of that great office. Presidents come and go,—some of them come too soon and go too late,—but they are all links in that glorious succession which for a century makes up the historical harmony of the State. Therefore I plead, Mr. Chairman, for all those trifling courtesies, for all those delicate social observances, which lend dignity to any political system, and exalt the conditions of all public life.

"If time permitted, I might call the attention of American students to other objects worthy their careful notice in Europe. I might mention that recognition of the omnipotence of law which, even among so orderly a people as ours, is not invariably felt in a broad, general, abstract sense. I might set over against the energy and restlessness of American life the element of æsthetic repose, which is an important condition of all great achievements in science, or art, or literature. But these can only be suggested, and others must be wholly omitted.

"In conclusion, Mr. Chairman, you will permit me, almost a veteran as it were of our little colony here, to pay a slight tribute to the young men whom during a term of four years I have seen come and go. I have known them and watched them carefully. I have observed their lofty scholastic zeal; I have learned to know their high conscientious purpose; and as their countryman I can say from the bottom of my heart that I am proud of them. They are not indifferent students; they are not superficial observers; and I am convinced that in their chosen professions, whether medicine, law, theology, or political science, they will carry back the best results of foreign study, and a broader equipment for the duties of the American citizen."

This is the spirit in which our young men should go abroad, and if they apply Professor Tuttle's lesson, they will on their return to America be a blessing to their own country and serve as channels through which the greatness of the Old World may flow over into the national life of the New World without adding here to the cramping conditions which there form a hindrance to a freer and higher development.

P. C.

ERKENNTNISTHEORETISCHE GRUNDZÜGE DER NATURWISSENSCHAFTEN UND IHRE BEZIEHUNGEN ZUM GEISTESLEBEN DER GEGENWART. Allgemein Wissenschaftliche Vorträge. By *Dr. P. Volkmann*, Professor an der Universität Königsberg i. Pr. Leipzig: B. G. Teubner. 1896. Pages, 181. Price, 6 Marks.

Professor Volkmann is a physicist by profession whom the waxing interest now centring about the philosophical problems of science, has moved to a daring plunge

into the "rude imperious surge" of epistemology. There is much in his book to commend, particularly its humanistic and popular spirit, as also the exalted educational objects which it sets. On this, and related excellences, there can be but one opinion. The interest of the philosophical student, however, lies in a different direction,—narrower, and in a measure more ungenerous, but technically of paramount importance,—an interest that concerns the independent and original contribution which the book ostensibly makes to science; and on this point there is ground for difference.

Perhaps owing to the popular form in which his thoughts are cast, Professor Volkmann's expositions have not the rigor and impressiveness which intrinsically belong to them; but antecedently we should be inclined to think to the contrary. The simple forms of the mathematical and physical sciences best lend themselves to the considerations with which epistemology is concerned, and it is precisely the simplest of these simple forms in connexion with which the elements of this discipline ought to be most satisfactorily developed. The success which the scientific predecessors of Professor Volkmann have achieved in this department is almost exclusively due to the fact that they have set out from just these branches of inquiry.

The volume is made up partly of a number of popular articles which originally appeared in *Himmel und Erde*, and partly of a series of popular lectures delivered in Königsberg. They discuss broadly the relations of the sciences and philosophy, the historical attitudes of mankind to knowledge, the characteristic features and tendencies of the main branches of scientific and humanistic research, the distinctive methods of scientific investigation, the wonderful acquisitions which have been its upshot, and lastly but not least, the bearings of all this momentous work upon methods of research in sociology and upon practical educational and intellectual problems. All this, as a matter of reproductive exposition, has been done clearly and intelligibly, in a manner commensurate with the author's accredited competency, and not infrequently with the added ornament of really elucidating the points at issue. What criticisms we have to make, apply solely to the principles which the author has advanced with polite but evident pretensions to power and novelty as epistemological aids, and which he regards as his unique and valuable contribution to the subject. These are the principles of Isolation and Superposition, which we may now briefly examine.

Nature bears, to all appearances, a predominantly composite character, which in cognition must be resolved into its constituent or determinative elements. These elements are then again combined to reobtain the phenomena of nature according to the varied exigencies of life and thought. Ordinarily these processes are styled abstraction and combination, analysis and synthesis, separation and composition, but Professor Volkmann prefers to call them *isolation* and *superposition*—designations which in his judgment carry meanings not conveyed by the traditional terms.

Superposition has a well-defined signification in elementary geometry, as a method of demonstrating congruency, and in physics as the method of adding vectors. It is only in this last meaning that it has any analogy with the proposed usage of Professor Volkmann, saving, perhaps, its etymology. It is possible that being "foreign words" in German, both these terms have a more technical clang in that language, and offer a seemingly richer field of prospective association than they do in English, where their use is common. This is an important consideration in the choice of new designations, as is evidenced by the formation of scientific terminology, and by the sorry figure which sometimes quite excellent appellations of new principles in one language cut when translated into another. Or again, they may be viewed as catch-words. Catch-words, even where they do not embody new ideas, may greatly elucidate the mechanism of research, if they are at all happy or even passably rich in associations, since this last attribute, as involving the principle of comparison, is really at the root of explanation. But either of these implied criteria a new term must satisfy. It must either have a rich connotation or admit of such being supplied. And neither of these demands do Professor Volkmann's innovations seem to satisfy, at least in a sufficient manner to justify the ousting of the old terms.

Do they offer then anything new on the side of their contents? We think not. Professor Volkmann's isolation is simply abstraction, and we gain nothing by saying we *isolate* the qualities and effects of nature rather than *abstract* them, any more than we should by saying that we *separate* or *extricate* them. The legitimate function of these terms is that of synonyms or helps in defining a fundamental operation. Similarly, we gain nothing by saying the *superposition* of forces rather than the *composition* of forces, nor by speaking of the superposition of effects generally rather than of their apparent *complexity* or *mingled action*, which in nature itself and objectively is *one* and only requires analysis because of the needs of *our* comprehension. Thus, a given force may be always viewed as the resultant of an indefinite number of other forces, indefinitely directed. But in the system of nature itself such a superposition of forces can scarcely be said to have *actual* significance, be its intellectual and practical justification what it may.

Professor Volkmann lays no stress on superposition as a principle of nature, however, but emphasises it solely as a principle of epistemology, having its prototype in the composition of forces. Yet what it elucidates here more than the present conception of the phenomena elucidates is also difficult to see. That the forces act *independently* of one another, or as if they produced their effects successively and separately, must be discovered and stated in both cases; and when that has been done there is nothing left. It is then just as clear to say that they are *compounded* as that they are *superposed*. The same is true of the other examples adduced (p. 76 et seq.); their character is apparent from their mere statement. And as to the extended application of the principles, to the concepts of abstract and concrete, theory and practice, school and life, being and thinking, etc., these too

must be pronounced unfortunate, since they can only be regarded as metaphorical extensions of the same idea, obvious enough, but withal considerably strained.

For example, since *abstract* and *concrete* are synonymous respectively with *centre of isolation* and *superpositum*, and forasmuch as a natural law is an *abstractum*, centre of isolation, or *isolatum*, therefore we can never logically expect that there should exist a law comprehending and explaining the *entirety* of nature, for the reason that nature is a concretum or, *novo termino*, a superpositum—where-with a dangerous but popular metaphysical error is refuted.

The conclusion is undeniable. Yet it might be just as well to risk the chances of being misunderstood by merely saying that a thing which is a knowledge of a *part* cannot logically be a knowledge of a *whole* consisting of dissimilar parts. As an instance of the power of the new view the example is not felicitous.

There is no gainsaying but Professor Volkmann by long dwelling upon his ideas of isolation and superposition—through the associations naturally formed—has found them of inestimable value in his personal efforts at orientation; but we opine that their natural sphere of usefulness ceases at this point. In denying to them absolute validity, we must bear in mind his prefatory disavowal of such a qualification for all epistemological norms, and his position that we are in search here of advantageous points of view only. But have they a wide validity even as such? Are they not an encumberment of our epistemological machinery, which is pretty heavy as it is? A supererogation? In our judgment they merely elaborate the fact that the processes of analysis and synthesis have always been, and are still, widely used in thinking.

We have no occasion to remark upon Professor Volkmann's strictures of Monism, as he identifies its doctrine absolutely with the principles advanced by Haeckel; their falling wide of the mark here is not our concern. Nor are our own animadversions to be conceived as derogatory to the general merits of Professor Volkmann's book,—merits which we believe are solid and which we have sufficiently emphasised above.

T. J. McC.

GRUNDRISS EINER GESCHICHTE DER NATURWISSENSCHAFTEN, ZUGLEICH EINE EINFÜHRUNG IN DAS STUDIUM DER NATURWISSENSCHAFTLICHEN LITTERATUR. Von Dr. Friedrich Dannemann. I. Band: erläuterte Abschnitte aus den Werken hervorragender Naturforscher. Mit 44 Abbildungen in Wiedergabe nach den Originalwerken. Leipsic: Wilhelm Engelmann. 1896. Pages, 375. Price, M. 6.

The closing years of the nineteenth century have been pre-eminently years of reflexion and retrospect. In the fever and haste of acquisition which followed upon the astounding revelations of the two first and classical centuries of scientific inquiry, ours had little time or composure for reverting to the works of the masters either for criticism or for stimulus. For the first the need did not as yet exist, and as for the second, perhaps, the quelling sources had not yet run dry. But with the